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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/536,721	10/14/2005	Christopher Paul Hancock	P08657US00/RFH	4351
881 7590 10/23/2009 STITES & HARBISON PLLC 1199 NORTH FAIRFAX STREET SUITE 900 ALEXANDRIA, VA 22314				
EXAMINER				
CHEN, VICTORIA W				
ART UNIT		PAPER NUMBER		
3739				
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10/23/2009		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/536,721

**Applicant(s)**

HANCOCK ET AL.

**Examiner**

VICTORIA W. CHEN

**Art Unit**

3739

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 27 May 2005.  
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 2-13 and 15-41 is/are pending in the application.  
4a) Of the above claim(s) 27-39 is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 2-13, 15-26, 40 and 41 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 27 May 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 2/16/07, 11/2/06, 1/27/06, 11/17/05  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_  
5) ☐ Notice of Informal Patent Application  
6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Election/Restrictions***

Applicant's election without traverse of claims 2-13, 15-26, 40 and 41 in the reply filed on 7/8/09 is acknowledged.

### ***Information Disclosure Statement***

The information disclosure statement filed 11/17/05 fails to comply with 37 CFR 1.98(a)(3) because it does not include a concise explanation of the relevance, as it is presently understood by the individual designated in 37 CFR 1.56(c) most knowledgeable about the content of the information, of each patent listed that is not in the English language. It has been placed in the application file, but the information referred to therein has not been considered.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 2-13 and 15-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Warner et al. (US 5957969) in view of Bulow (US 6256130 B1).**

Regarding claim 2, Warner teaches a source of microwave radiation [20] having a frequency; a probe [50] connected to said source, said probe being configured for directing said microwave radiation into said tissue to be ablated; a first detector [121, Fig. 1] which detects the magnitude of a reflected portion of the microwave radiation reflected back towards the source, the detector determining the magnitude of the reflected portion and an impedance adjuster [30]

having an input connected to said source of microwave radiation and an output connected to said probe, said input and output having respective complex impedances, said complex impedance of said output being adjustable. Warner teaches using the feedback of the detector for controlling the matching of impedances in order to minimize reflectance [col. 5, ll. 65-67, col. 6, ll. 1-16], but fails to specifically teach the use of a local oscillator. Warner further teaches that any type of power monitor can be used [col. 4, ll. 64-66]. Bulow teaches using a heterodyne receiver as a power monitor in a system for detecting signals which were degraded via reflectance since heterodyne reception has the advantage of providing amplitude and phase data, and therefore allows for easier elimination of distortion caused by the reflected signal [col. 1, ll. 35-57]. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to substitute the heterodyne receiver for the detector as taught by Warner to provide the advantage of allowing for easier elimination of distortion caused by the reflected signal.

Regarding claim 3, Warner in view of Bulow teaches a second detector [Warner, 121, Fig 1] for detecting the magnitude and phase of the forward directed microwave radiation directed from said source toward said probe, said second detector being connected to said local oscillator or a different local oscillator.

Regarding claim 4, Warner in view of Bulow teaches the invention as claimed, but fails to specifically teach a third detector. It would have been obvious to one having ordinary skill in the art at the time the invention was made to add an additional detector for detecting the magnitude and phase of either the forward directed microwave radiation or reflected microwave radiation, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

Regarding claims 5 and 6, it is commonly known that heterodyne receivers comprise mixers, power sensors, phase comparators in communication with a local oscillator (e.g. see US 5991605, col. 1, ll. 30-39).

Regarding claim 7, Warner in view of Bulow teaches the local oscillator is separate from the source of microwave radiation (e.g. the source is seen in Fig. 1 of Warner as 22, and the heterodyne detector would take place of sensor 121, which is separate from the source).

Regarding claim 8, it is commonly known that heterodyne receivers are configured to produce a signal derived from said source, but having a different frequency to the frequency of said source of microwave radiation (see US 5991605, col. 1, ll. 30-34).

Regarding claim 9, Warner teaches a controller [35] for automatically adjusting said adjustable complex impedance of said impedance adjustor on the basis of the magnitude and phase of said radiation detected by said detector [col. 6, ll. 50-64].

Regarding claim 10, Warner teaches said controller [35] is configured to adjust said adjustable complex impedance dynamically in response to the variation in the magnitude and phase of said radiation detected by said detector [col. 6, ll. 50-64].

Regarding claim 11, Warner teaches said probe [50] is configured to penetrate biological tissue [col. 4, ll. 25-31].

Regarding claim 12, Warner teaches a separator [27, 28] for separating reflected microwave radiation from forward directed microwave radiation being directed towards said probe.

Regarding claim 14, Warner teaches said impedance adjuster is a stub tuner [col. 5, ll. 48-53].

Regarding claim 15, Warner teaches the probe is coaxial [col. 8, ll. 11-16].

Regarding claim 16, Warner teaches the probe is a waveguide [col. 8, ll. 11-16].

Regarding claim 17, Warner teaches the claimed invention except for the outer diameter of the probe being less than 1mm. Warner does teach that the diameter of the probe is capable of being adjusted to suit the needs of the particular system [col. 8, ll. 16-19]. It would have been obvious to one having ordinary skill in the art at the time the invention was made to make the diameter smaller than 1 mm for procedures which require smaller diameters, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Regarding claim 18, Warner teaches the source of microwave radiation produces radiation of wavelength  $\lambda$ , and a radiation channeling means for conveying microwave radiation connects said impedance adjuster and said probe, said channeling means having an adjustable length whereby the combined length of said channeling means and said probe can be adjusted to be equal to a multiple of  $\lambda/2$  [col. 9, ll. 1-14, col. 11, ll. 49-58].

Regarding claim 19, Warner teaches using a source of microwave radiation [20] to provide microwave radiation; placing a probe [50] in contact with or inserting a probe into biological tissue; directing said microwave radiation through said probe into the tissue to ablate the tissue [col. 4, ll. 25-31]; detecting the magnitude and phase of microwave radiation reflected back through the probe by using a first detector [121], and adjusting the complex impedance of

an impedance adjuster [30] between said source and said probe on the basis of the magnitude and phase of the microwave radiation detected by said first detector [col. 6, ll. 11-15 and ll. 50-64]. However, Warner fails to specifically teach the use of a local oscillator. Warner does teach that any type of power monitor can be used [col. 4, ll. 64-66]. Bulow teaches using a heterodyne receiver as a power monitor in a system for detecting signals which were degraded via reflectance since heterodyne reception has the advantage of providing amplitude and phase data, and therefore allows for easier elimination of distortion caused by the reflected signal [col. 1, ll. 35-57]. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to substitute the heterodyne receiver, and thus include the local oscillator, for the detector as taught by Warner to provide the advantage of allowing for easier elimination of distortion caused by the reflected signal.

Regarding claim 20, Warner teaches using a source of microwave radiation [20] to provide microwave radiation having a frequency; placing a probe [50] in contact with or inserting a probe into biological tissue; directing said microwave radiation from said source through an impedance adjuster [30] and then through said probe into said tissue to ablate the tissue; said impedance adjuster having an input connected to said source and an output connected to said probe [Fig. 1], said input and said output having respective complex impedances; detecting the magnitude and phase of reflected microwave radiation reflected back through said probe by using a first detector [121], said first detector used to determine the magnitude and phase of said reflected radiation; and adjusting said complex impedance of said output of said impedance adjuster on the basis of said magnitude and phase of said reflected microwave radiation detected by said first detector, so as to minimize the amount of microwave radiation

which is reflected back through said probe [col. 6, ll. 50-64]. However, Warner fails to specifically teach the use of a local oscillator. Warner does teach that any type of power monitor can be used [col. 4, ll. 64-66]. Bulow teaches using a heterodyne receiver as a power monitor in a system for detecting signals which were degraded via reflectance since heterodyne reception has the advantage of providing amplitude and phase data, and therefore allows for easier elimination of distortion caused by the reflected signal [col. 1, ll. 35-57]. It is further commonly known that the local oscillators within heterodyne receivers are configured to produce a signal having a different frequency to the frequency of said source of microwave radiation (see US 5991605, col. 1, ll. 30-34). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to substitute the heterodyne receiver, and thus include the local oscillator, for the detector as taught by Warner to provide the advantage of allowing for easier elimination of distortion caused by the reflected signal.

Regarding claims 21 and 22, Warner teaches the method as claimed but fails to specifically teach the probe is inserted into the tissue using microwave radiation to cut through the tissue so that an end of the probe is proximate to or inside a cancerous tumor in the tissue and microwave radiation is then passed through the probe to ablate said cancerous tumor. Warner does teach that the ablation catheter can be used for a wide variety of alternative applications [col. 15, ll. 16-20] and further that microwave ablation is commonly used to ablate tumors [col. 1, ll. 41-45]. Therefore, it would have been obvious to one of ordinary skill to use the invention as taught by Warner as a microwave ablation catheter for treating tumors since it is commonly known to use microwave ablation to treat cancer.

Regarding claim 23, Warner in view of Bulow teaches the magnitude and phase of forward directed microwave radiation directed toward said probe from said source of microwave radiation is detected by using a second detector [Warner, 121, col. 4, ll. 58-64] and said local oscillator or a different local oscillator, and said adjustable complex impedance of said impedance adjuster is adjusted based on the signal magnitudes and phases detected by said first and second detectors.

Regarding claim 24, Warner teaches the invention as claimed, but fails to specifically teach a third detector. It would have been obvious to one having ordinary skill in the art at the time the invention was made to add an additional detector for detecting the magnitude and phase of either the forward directed microwave radiation or reflected microwave radiation, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

Regarding claim 25, Warner teaches said adjustable complex impedance of said impedance adjuster is adjusted automatically by a control means [35] on the basis of said magnitude and phase detected by said detector so as to minimize the amount of microwave radiation reflected back through said probe [col. 6, ll. 50-64].

Regarding claim 26, Warner teaches said impedance adjustment is carried out dynamically as the detected magnitude and phase varies [col. 6, ll. 50-64].

**Claims 40 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Warner in view of Bulow, as applied to claim 2 above, in further view of Driscoll (US 5519359).**

Regarding claim 40, Warner in view of Bulow teach the invention as claimed, but fail to teach the source of microwave radiation is phase locked to a single frequency. Driscoll teaches a microwave oscillator system having a phase-locked oscillator frequency in order to improve the signal to noise ratio of the output [col. 1, ll. 18-19]. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to phase lock the microwave radiation source to a single frequency as taught by Driscoll in order to improve the signal to noise ratio of the output.

Regarding claim 41, Warner teaches the source is tunable [via 30] so that its single output frequency can be varied in a controlled manner.

### *Conclusion*

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 5113065 A	USPAT	Heynau; Hans A.	Heterodyne circular photodetector array in a tracking system
US 20060273255 A1	US-PGPUB	Volkov; Leonid Victorovich et al.	Method for forming the image in millimetre and sub-millimetre wave band (variants), system for forming the image in millimetre and sub-millimeter wave band (variants), diffuser light (variants) and transceiver (variants)
US 20020158212 A1	US-PGPUB	French, Todd E. et al.	Apparatus and methods for time-resolved optical spectroscopy
US 6020795 A	USPAT	Kim; Sung-Uk	Electrically controllable impedance matching device for use in RF amplifier
US 5704355 A	USPAT	Bridges; Jack E.	Non-invasive system for breast cancer detection
US 6890331 B2	USPAT	Kristensen; Tom	Electrosurgical apparatus
US 7226446 B1	USPAT	Mody; Dinesh et al.	Surgical microwave ablation assembly
US 6673068 B1	USPAT	Berube; Dany	Electrode arrangement for use in a medical instrument

Any inquiry concerning this communication or earlier communications from the examiner should be directed to VICTORIA W. CHEN whose telephone number is (571)272-3356. The examiner can normally be reached on M-F 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Linda Dvorak can be reached on (571) 272-4764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Victoria W Chen/  
Examiner, Art Unit 3739

/Michael Peffley/  
Primary Examiner, Art Unit 3739